

## **RAW SEQUENCE LISTING**

**The Biotechnology Systems Branch of the Scientific and Technical  
Information Center (STIC) no errors detected.**

Application Serial Number: 10/521,693  
Source: PGT  
Date Processed by STIC: 1/26/06

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PCT

**RAW SEQUENCE LISTING**  
**PATENT APPLICATION:** US/10/521,693

DATE: 01/26/2006  
 TIME: 08:48:06

Input Set : F:\10.521693 seq lst.txt  
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3 <110> APPLICANT: AKZO Nobel N.V.  
 5 <120> TITLE OF INVENTION: novel Brachyspira hyodysenteriae vaccine  
 7 <130> FILE REFERENCE: Bhyovaccine  
 C--> 9 <140> CURRENT APPLICATION NUMBER: US/10/521,693  
 C--> 9 <141> CURRENT FILING DATE: 2005-01-18  
 9 <160> NUMBER OF SEQ ID NOS: 4  
 11 <170> SOFTWARE: PatentIn version 3.1  
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 15 <212> TYPE: DNA  
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 21 <223> OTHER INFORMATION:

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| 26 | Met Lys Lys Leu Tyr Ser Leu Phe Ile Phe Ile Ala Val Ile Leu Phe |     |
| 27 | 1 5 10 15   |     |
| 29 | att tat tca tgc gga agt tat ttt aat cct aaa tac tat ttt ttt aaa | 96  |
| 30 | Ile Tyr Ser Cys Gly Ser Tyr Phe Asn Pro Lys Tyr Tyr Phe Phe Lys |     |
| 31 | 20 25 30  |     |
| 33 | agt aaa gta gag aat aat gga agt tct gga agc tca ggc ggt aat tca | 144 |
| 34 | Ser Lys Val Glu Asn Asn Gly Ser Ser Gly Ser Ser Gly Gly Asn Ser |     |
| 35 | 35 40 45  |     |
| 37 | gga ata tat ata cag cct ggt gaa gat gaa gat cct ttt aca gca cct | 192 |
| 38 | Gly Ile Tyr Ile Gln Pro Gly Glu Asp Glu Asp Pro Phe Thr Ala Pro |     |
| 39 | 50 55 60  |     |
| 41 | aaa tat gca tct gag tgg tgg aat gat cct aat aat ggt gga ttt gat | 240 |
| 42 | Lys Tyr Ala Ser Glu Trp Trp Asn Asp Pro Asn Asn Gly Gly Phe Asp |     |
| 43 | 65 70 75 80   |     |
| 45 | gct tcg gat ata gat aaa tgg ttt ttg aaa gtt gaa ttt tta gca aat | 288 |
| 46 | Ala Ser Asp Ile Asp Lys Trp Phe Leu Lys Val Glu Phe Leu Ala Asn |     |
| 47 | 85 90 95  |     |
| 49 | gat tat cca agt tac aga ttt tta aca aaa agc gga aga aaa gca gga | 336 |
| 50 | Asp Tyr Pro Ser Tyr Arg Phe Leu Thr Lys Ser Gly Arg Lys Ala Gly |     |
| 51 | 100 105 110   |     |
| 53 | cat gtt tgg gta gtt tct aat gaa caa tct cag gca tat tta gat caa | 384 |
| 54 | His Val Trp Val Val Ser Asn Glu Gln Ser Gln Ala Tyr Leu Asp Gln |     |
| 55 | 115 120 125   |     |
| 57 | gga gaa gta tgc aat act aca gca gtt acc ggg gta tct ata aaa cca | 432 |
| 58 | Gly Glu Val Cys Asn Thr Thr Ala Val Thr Gly Val Ser Ile Lys Pro |     |
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| 65  | gca | aga | ttt | tcc | act | cat | gac | gga | gat | tat | cat | aat | gta | tat | cct | gga |     | 528  |
| 66  | Ala | Arg | Phe | Phe | Thr | His | Asp | Gly | Asp | Tyr | His | Asn | Val | Tyr | Pro | Gly |     |      |
| 67  |     |     | 165 |     |     |     |     |     | 170 |     |     |     |     |     |     | 175 |     |      |
| 69  | aaa | gat | aag | ata | agc | aga | ttc | tat | ttt | tat | ttt | aca | ggt | act | ccg |     | 576 |      |
| 70  | Lys | Asp | Lys | Ile | Ser | Arg | Phe | Tyr | Phe | Tyr | Tyr | Phe | Thr | Gly | Thr | Pro |     |      |
| 71  |     |     | 180 |     |     |     |     |     | 185 |     |     |     |     |     |     | 190 |     |      |
| 73  | gaa | atg | gct | aaa | ttt | tta | gaa | aat | tgc | tta | ata | gct | gta | gac | aca | tac |     | 624  |
| 74  | Glu | Met | Ala | Lys | Phe | Leu | Glu | Asn | Cys | Leu | Ile | Ala | Val | Asp | Thr | Tyr |     |      |
| 75  |     |     | 195 |     |     |     |     |     | 200 |     |     |     |     |     |     | 205 |     |      |
| 77  | tca | aaa | cta | tta | ttt | tac | tat | gga | aga | cct | caa | agc | gat | tat | cca | aat |     | 672  |
| 78  | Ser | Lys | Leu | Leu | Phe | Tyr | Tyr | Gly | Arg | Pro | Gln | Ser | Asp | Tyr | Pro | Asn |     |      |
| 79  |     |     | 210 |     |     |     |     |     | 215 |     |     |     |     |     |     | 220 |     |      |
| 81  | cct | cca | agc | tgg | cag | aag | cct | agt | aat | ttg | gtt | gat | aaa | tac | tct | cct |     | 720  |
| 82  | Pro | Pro | Ser | Trp | Gln | Lys | Pro | Ser | Asn | Leu | Val | Asp | Lys | Tyr | Ser | Pro |     |      |
| 83  | 225 |     |     |     | 230 |     |     |     |     | 235 |     |     |     |     |     | 240 |     |      |
| 85  | aca | ggt | tat | tgg | ata | tct | ata | gat | gaa | ggt | ata | aat | gat | aag | ggg | cag |     | 768  |
| 86  | Thr | Gly | Tyr | Trp | Ile | Ser | Ile | Asp | Glu | Gly | Ile | Asn | Asp | Lys | Gly | Gln |     |      |
| 87  |     |     | 245 |     |     |     |     |     | 250 |     |     |     |     |     |     | 255 |     |      |
| 89  | aat | tat | cct | ttt | tat | gaa | tat | gat | cct | gta | gga | tat | gta | aaa | agc | gat |     | 816  |
| 90  | Asn | Tyr | Pro | Phe | Tyr | Glu | Tyr | Asp | Pro | Val | Gly | Tyr | Val | Lys | Ser | Asp |     |      |
| 91  |     |     | 260 |     |     |     |     |     | 265 |     |     |     |     |     |     | 270 |     |      |
| 93  | ggt | aca | gtt | ata | ttt | gat | tgg | ttt | gca | aac | aga | tta | aga | gga | aat |     | 864 |      |
| 94  | Gly | Thr | Val | Val | Ile | Phe | Asp | Trp | Phe | Ala | Asn | Arg | Leu | Arg | Gly | Asn |     |      |
| 95  |     |     | 275 |     |     |     |     |     | 280 |     |     |     |     |     |     | 285 |     |      |
| 97  | cat | aat | aat | gat | cct | ata | aaa | agt | gat | cct | aaa | gga | gct | att | gtt | cct |     | 912  |
| 98  | His | Asn | Asn | Asp | Pro | Ile | Lys | Ser | Asp | Pro | Lys | Gly | Ala | Ile | Val | Pro |     |      |
| 99  |     |     | 290 |     |     |     |     |     | 295 |     |     |     |     |     |     | 300 |     |      |
| 101 | aat | cct | aat | act | aat | cct | tct | gct | tca | act | aca | gga | cgt | tct | cct | tat |     | 960  |
| 102 | Asn | Pro | Asn | Thr | Asn | Pro | Ser | Ala | Ser | Thr | Thr | Gly | Arg | Ser | Pro | Tyr |     |      |
| 103 | 305 |     |     |     | 310 |     |     |     |     | 315 |     |     |     |     |     | 320 |     |      |
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| 106 | Ala | Phe | Tyr | Ser | Pro | Leu | Ala | Gln | Lys | Asp | Lys | Thr | Lys | Ile | Thr | Ile |     |      |
| 107 |     |     | 325 |     |     |     |     |     | 330 |     |     |     |     |     |     | 335 |     |      |
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| 110 | Ser | Thr | Thr | Lys | Leu | Ile | Asn | Tyr | Thr | Val | Phe | Ser | Tyr | Lys | Tyr | Ser |     |      |
| 111 |     |     | 340 |     |     |     |     |     | 345 |     |     |     |     |     |     | 350 |     |      |
| 113 | ata | caa | ata | ttt | ccg | cct | agt | atg | aaa | gaa | gaa | aaa | ctt | cct | tat | gct |     | 1104 |
| 114 | Ile | Gln | Ile | Phe | Pro | Pro | Ser | Met | Lys | Glu | Glu | Lys | Leu | Pro | Tyr | Ala |     |      |
| 115 |     |     | 355 |     |     |     |     |     | 360 |     |     |     |     |     |     | 365 |     |      |
| 117 | tat | att | gca | tat | gct | tcc | tat | ggt | gca | gct | tat | caa | aat | gaa | agc | agc |     | 1152 |
| 118 | Tyr | Ile | Ala | Tyr | Ala | Ser | Tyr | Gly | Ala | Ala | Tyr | Gln | Asn | Glu | Ser | Ser |     |      |
| 119 |     |     | 370 |     |     |     |     |     | 375 |     |     |     |     |     |     | 380 |     |      |
| 121 | aaa | tct | gta | gag | atg | ata | tct | gat | ata | aat | aaa | gga | gag | cat | tac | gga |     | 1200 |
| 122 | Lys | Ser | Val | Glu | Met | Ile | Ser | Asp | Ile | Asn | Lys | Gly | Glu | His | Tyr | Gly |     |      |
| 123 | 385 |     |     |     | 390 |     |     |     |     | 395 |     |     |     |     |     | 400 |     |      |
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| 126 | Ser   | Ile       | Thr                       | Arg | Ile | Ser | Thr | Val | Pro | Lys | Ile | Asp | Lys | Asp | Gly | Gly |      |
| 127 |       |           |                           |     | 405 |     |     |     | 410 |     |     |     |     |     | 415 |     |      |
| 129 | gag   | ttg       | gta                       | aaa | gaa | gga | tct | aag | tct | ttt | gaa | tta | tat | ggt | att | gat | 1296 |
| 130 | Glu   | Leu       | Val                       | Lys | Glu | Gly | Ser | Lys | Phe | Glu | Leu | Tyr | Gly | Ile | Asp |     |      |
| 131 |       |           |                           |     | 420 |     |     |     | 425 |     |     |     |     |     | 430 |     |      |
| 133 | act   | aaa       | gat                       | aca | ttt | ata | gaa | tta | agt | tta | aaa | cta | att | aaa | aat | gat | 1344 |
| 134 | Thr   | Lys       | Asp                       | Thr | Phe | Ile | Glu | Leu | Ser | Leu | Lys | Leu | Ile | Lys | Asn | Asp |      |
| 135 |       |           |                           |     | 435 |     |     |     | 440 |     |     |     |     |     | 445 |     |      |
| 137 | gaa   | aat       | aca                       | gaa | ttt | gtt | gat | caa | gga | aca | gca | ggt | act | ggt | cct | tta | 1392 |
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| 139 |       |           |                           |     | 450 |     |     |     | 455 |     |     |     |     |     | 460 |     |      |
| 141 | gta   | tac       | ttt                       | gat | aaa | aca | gat | cct | ata | ctt | gta | tta | aaa | tat | gat | aaa | 1440 |
| 142 | Val   | Tyr       | Phe                       | Asp | Lys | Thr | Asp | Pro | Ile | Leu | Val | Leu | Lys | Tyr | Asp | Lys |      |
| 143 | 465   |           |                           |     | 470 |     |     |     | 475 |     |     |     |     |     | 480 |     |      |
| 145 | tct   | tct       | gac                       | agc | ttc | aaa | tac | agc | agt | gta | aaa | gga | aac | aag | caa | ata | 1488 |
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| 150 | Glu   | Val       | Asp                       | Ser | Asn | Leu | Ser | Ile | Lys | Arg | Gly | Glu | Asn | Lys | Glu | Phe |      |
| 151 |       |           |                           |     | 500 |     |     |     | 505 |     |     |     |     |     | 510 |     |      |
| 153 | aca   | gtt       | aaa                       | ttt | aaa | gat | cca | aat | aat | gga | aat | gag | ttt | ggg | gtt | gta | 1584 |
| 154 | Thr   | Val       | Lys                       | Phe | Lys | Asp | Pro | Asn | Asn | Gly | Asn | Glu | Phe | Gly | Val | Val |      |
| 155 |       |           |                           |     | 515 |     |     |     | 520 |     |     |     |     |     | 525 |     |      |
| 157 | ttt   | aaa       | ata                       | gat | ttt | gaa | aaa | ata | tca | tga |     |     |     |     |     |     | 1614 |
| 158 | Phe   | Lys       | Ile                       | Asp | Phe | Glu | Lys | Ile | Ser |     |     |     |     |     |     |     |      |
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| 173 | Ile   | Tyr       | Ser                       | Cys | Gly | Ser | Tyr | Phe | Asn | Pro | Lys | Tyr | Tyr | Phe | Phe | Lys |      |
| 174 |       |           |                           |     | 20  |     |     |     | 25  |     |     |     |     |     | 30  |     |      |
| 177 | Ser   | Lys       | Val                       | Glu | Asn | Asn | Gly | Ser | Ser | Gly | Ser | Ser | Gly | Gly | Asn | Ser |      |
| 178 |       |           |                           |     | 35  |     |     |     | 40  |     |     |     |     |     | 45  |     |      |
| 181 | Gly   | Ile       | Tyr                       | Ile | Gln | Pro | Gly | Glu | Asp | Glu | Asp | Pro | Phe | Thr | Ala | Pro |      |
| 182 |       |           |                           |     | 50  |     |     |     | 55  |     |     |     |     |     | 60  |     |      |
| 185 | Lys   | Tyr       | Ala                       | Ser | Glu | Trp | Trp | Asn | Asp | Pro | Asn | Asn | Gly | Gly | Phe | Asp |      |
| 186 |       |           |                           |     |     | 65  |     |     | 70  |     |     | 75  |     |     | 80  |     |      |
| 189 | Ala   | Ser       | Asp                       | Ile | Asp | Lys | Trp | Phe | Leu | Lys | Val | Glu | Phe | Leu | Ala | Asn |      |
| 190 |       |           |                           |     |     | 85  |     |     | 90  |     |     |     |     |     | 95  |     |      |
| 193 | Asp   | Tyr       | Pro                       | Ser | Tyr | Arg | Phe | Leu | Thr | Lys | Ser | Gly | Arg | Lys | Ala | Gly |      |
| 194 |       |           |                           |     |     | 100 |     |     | 105 |     |     |     |     |     | 110 |     |      |
| 197 | His   | Val       | Trp                       | Val | Val | Ser | Asn | Glu | Gln | Ser | Gln | Ala | Tyr | Leu | Asp | Gln |      |
| 198 |       |           |                           |     |     | 115 |     |     | 120 |     |     |     |     |     | 125 |     |      |
| 201 | Gly   | Glu       | Val                       | Cys | Asn | Thr | Thr | Ala | Val | Thr | Gly | Val | Ser | Ile | Lys | Pro |      |
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 209 Ala Arg Phe Phe Thr His Asp Gly Asp Tyr His Asn Val Tyr Pro Gly  
 210 165 170 175  
 213 Lys Asp Lys Ile Ser Arg Phe Tyr Phe Tyr Tyr Phe Thr Gly Thr Pro  
 214 180 185 190  
 217 Glu Met Ala Lys Phe Leu Glu Asn Cys Leu Ile Ala Val Asp Thr Tyr  
 218 195 200 205  
 221 Ser Lys Leu Leu Phe Tyr Tyr Gly Arg Pro Gln Ser Asp Tyr Pro Asn  
 222 210 215 220  
 225 Pro Pro Ser Trp Gln Lys Pro Ser Asn Leu Val Asp Lys Tyr Ser Pro  
 226 225 230 235 240  
 229 Thr Gly Tyr Trp Ile Ser Ile Asp Glu Gly Ile Asn Asp Lys Gly Gln  
 230 245 250 255  
 233 Asn Tyr Pro Phe Tyr Glu Tyr Asp Pro Val Gly Tyr Val Lys Ser Asp  
 234 260 265 270  
 237 Gly Thr Val Val Ile Phe Asp Trp Phe Ala Asn Arg Leu Arg Gly Asn  
 238 275 280 285  
 241 His Asn Asn Asp Pro Ile Lys Ser Asp Pro Lys Gly Ala Ile Val Pro  
 242 290 295 300  
 245 Asn Pro Asn Thr Asn Pro Ser Ala Ser Thr Thr Gly Arg Ser Pro Tyr  
 246 305 310 315 320  
 249 Ala Phe Tyr Ser Pro Leu Ala Gln Lys Asp Lys Thr Lys Ile Thr Ile  
 250 325 330 335  
 253 Ser Thr Thr Lys Leu Ile Asn Tyr Thr Val Phe Ser Tyr Lys Tyr Ser  
 254 340 345 350  
 257 Ile Gln Ile Phe Pro Pro Ser Met Lys Glu Glu Lys Leu Pro Tyr Ala  
 258 355 360 365  
 261 Tyr Ile Ala Tyr Ala Ser Tyr Gly Ala Ala Tyr Gln Asn Glu Ser Ser  
 262 370 375 380  
 265 Lys Ser Val Glu Met Ile Ser Asp Ile Asn Lys Gly Glu His Tyr Gly  
 266 385 390 395 400  
 269 Ser Ile Thr Arg Ile Ser Thr Val Pro Lys Ile Asp Lys Asp Gly Gly  
 270 405 410 415  
 273 Glu Leu Val Lys Glu Gly Ser Lys Ser Phe Glu Leu Tyr Gly Ile Asp  
 274 420 425 430  
 277 Thr Lys Asp Thr Phe Ile Glu Leu Ser Leu Lys Leu Ile Lys Asn Asp  
 278 435 440 445  
 281 Glu Asn Thr Glu Phe Val Asp Gln Gly Thr Ala Gly Thr Gly Pro Leu  
 282 450 455 460  
 285 Val Tyr Phe Asp Lys Thr Asp Pro Ile Leu Val Leu Lys Tyr Asp Lys  
 286 465 470 475 480  
 289 Ser Ser Asp Ser Phe Lys Tyr Ser Ser Val Lys Gly Asn Lys Gln Ile  
 290 485 490 495  
 293 Glu Val Asp Ser Asn Leu Ser Ile Lys Arg Gly Glu Asn Lys Glu Phe  
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 297 Thr Val Lys Phe Lys Asp Pro Asn Asn Gly Asn Glu Phe Gly Val Val  
 298 515 520 525  
 301 Phe Lys Ile Asp Phe Glu Lys Ile Ser

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| 308 <213>   | ORGANISM: Brachyspira hyodysenteria |     |     |
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| 312 <222>   | LOCATION: (1)..(537)                |     |     |
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| 319 1 5 10 15   |                                     |     |     |
| 321 gga tgt gaa act atg cag cct aaa aat aat gat aca att gta aaa aat |                                     |     | 96  |
| 322 Gly Cys Glu Thr Met Gln Pro Lys Asn Asn Asp Thr Ile Val Lys Asn |                                     |     |     |
| 323 20 25 30  |                                     |     |     |
| 325 gat aat tca tct aat gaa gat aaa aaa gaa gaa act ata act aga gaa |                                     |     | 144 |
| 326 Asp Asn Ser Ser Asn Glu Asp Lys Lys Glu Glu Thr Ile Thr Arg Glu |                                     |     |     |
| 327 35 40 45  |                                     |     |     |
| 329 gat aca cca aaa atg aaa gtt aca gtt tat gga gca gat aaa gaa att |                                     |     | 192 |
| 330 Asp Thr Pro Lys Met Lys Val Thr Val Tyr Gly Ala Asp Lys Glu Ile |                                     |     |     |
| 331 50 55 60  |                                     |     |     |
| 333 caa gct gtg gaa ata aat gat aaa act tat tat gta ata ggc gga aaa |                                     |     | 240 |
| 334 Gln Ala Val Glu Ile Asn Asp Lys Thr Tyr Tyr Val Ile Gly Gly Lys |                                     |     |     |
| 335 65 70 75 80   |                                     |     |     |
| 337 gat gtt gag aat atg aca gaa gct gat ata aaa aaa tca tct tta gta |                                     |     | 288 |
| 338 Asp Val Glu Asn Met Thr Glu Ala Asp Ile Lys Lys Ser Ser Leu Val |                                     |     |     |
| 339 85 90 95  |                                     |     |     |
| 341 gca cct tta aaa gtt aca gaa gaa act gtt aat ggt aca aga ggt ata |                                     |     | 336 |
| 342 Ala Pro Leu Lys Val Thr Glu Glu Thr Val Asn Gly Thr Arg Gly Ile |                                     |     |     |
| 343 100 105 110   |                                     |     |     |
| 345 gtt gtt aca tat tat gat gta aaa gta ttc ttg ggt aaa aga aca gga |                                     |     | 384 |
| 346 Val Val Thr Tyr Tyr Asp Val Lys Val Phe Leu Gly Lys Arg Thr Gly |                                     |     |     |
| 347 115 120 125   |                                     |     |     |
| 349 aca gga act atc gta gga ata ttc gag cct cag aaa aat gat tgg act |                                     |     | 432 |
| 350 Thr Gly Thr Ile Val Gly Ile Phe Glu Pro Gln Lys Asn Asp Trp Thr |                                     |     |     |
| 351 130 135 140   |                                     |     |     |
| 353 aca gga aat gat ttg gat aga agt tta tct att caa ata aaa tta tct |                                     |     | 480 |
| 354 Thr Gly Asn Asp Leu Asp Arg Ser Leu Ser Ile Gln Ile Lys Leu Ser |                                     |     |     |
| 355 145 150 155 160   |                                     |     |     |
| 357 aga aat ata gca ggt cct ata gat ata aaa aga gga agc ata tct tta |                                     |     | 528 |
| 358 Arg Asn Ile Ala Gly Pro Ile Asp Ile Lys Arg Gly Ser Ile Ser Leu |                                     |     |     |
| 359 165 170 175   |                                     |     |     |
| 361 gca ttt aat taa   |                                     |     | 540 |
| 362 Ala Phe Asn   |                                     |     |     |
| 366 <210>   | SEQ ID NO: 4                        |     |     |
| 367 <211>   | LENGTH: 179                         |     |     |
| 368 <212>   | TYPE: PRT                           |     |     |
| 369 <213>   | ORGANISM: Brachyspira hyodysenteria |     |     |

**VERIFICATION SUMMARY**

PATENT APPLICATION: US/10/521,693

DATE: 01/26/2006

TIME: 08:48:07

Input Set : F:\10.521693 seq lst.txt  
Output Set: N:\CRF4\01262006\J521693.raw

L:9 M:270 C: Current Application Number differs, Replaced Current Application No

L:9 M:271 C: Current Filing Date differs, Replaced Current Filing Date

L:24 M:258 W: Mandatory Feature missing, <223> Blank for SEQ#:1,Line#:21

L:316 M:258 W: Mandatory Feature missing, <223> Blank for SEQ#:3,Line#:313